

# Investigation

## 2

## Exploring Linear Functions With Graphs and Tables

**I**n the last investigation, you examined relationships that were linear functions. For example, the *distance* a person walks at a constant rate is a function of the amount of *time* a person walks. The *amount of money* a person collects from a walkathon sponsor who pays a fixed amount per *kilometer* is a function of the distance walked. You used tables, graphs, and equations to answer questions about these relationships.

In this investigation, you will continue to solve problems involving linear functions.



### 2.1

### Walking to Win

**I**n Ms. Chang's class, Emile found out that his walking rate is 2.5 meters per second. When he gets home from school, he times his little brother Henri as Henri walks 100 meters. He figured out that Henri's walking rate is 1 meter per second.

## Problem 2.1 Finding the Point of Intersection

Henri challenges Emile to a walking race. Because Emile's walking rate is faster, Emile gives Henri a 45-meter head start. Emile knows his brother would enjoy winning the race, but he does not want to make the race so short that it is obvious his brother will win.

- A. How long should the race be so that Henri will win in a close race?
- B. Describe your strategy for finding your answer to Question A. Give evidence to support your answer.



**ACE** Homework starts on page 31.

## 2.2 Crossing the Line

**Y**our class may have found some very interesting strategies for solving Problem 2.1, such as:

- Making a table showing time and distance data for both brothers
- Graphing time and distance data for both brothers on the same set of axes
- Writing an equation for each brother representing the relationship between time and distance

*How can each of these strategies be used to solve the problem?*

*What other strategies were used in your class?*

## Problem 2.2 Using Tables, Graphs, and Equations

- A.** For each brother in Problem 2.1:
1. Make a table showing the *distance from the starting line* at several different times during the first 40 seconds.
  2. Graph the time and the distance from the starting line on the same set of axes.
  3. Write an equation representing the relationship. Explain what information each variable and number represents.
- B.**
1. How far does Emile walk in 20 seconds?
  2. After 20 seconds, how far apart are the brothers? How is this distance represented in the table and on the graph?
  3. Is the point (26, 70) on either graph? Explain.
  4. When will Emile overtake Henri? Explain.
- C.** How can you determine which of two lines will be steeper
1. from a table of the data?
  2. from an equation?
- D.**
1. At what points do Emile's and Henri's graphs cross the y-axis?
  2. What information do these points represent in terms of the race?
  3. How can these points be found in a table? In an equation?

**ACE** Homework starts on page 31.

### Did You Know?

Have you ever seen a walking race? You may have thought the walking style of the racers seemed rather strange. Race walkers must follow two rules:

- The walker must always have one foot in contact with the ground.
- The walker's leg must be straight from the time it strikes the ground until it passes under the body.

A champion race walker can cover a mile in about 6.5 minutes. It takes most people 15 to 20 minutes to walk a mile.



For: Information about race-walking  
Web Code: ane-9031

